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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/699,060	10/31/2003	Edward Durell Benjamin	138766	2583

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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/699,060	BENJAMIN ET AL.	
	Examiner	Art Unit	
	Christopher Verdier	3745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 August 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8,10-17,19-30 and 32-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8,10-17,19-30 and 32-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5-9-07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Applicant's Amendment dated August 20, 2007 has been carefully considered but is non-persuasive. Claims 1-8, 10-17, 19-30 and 32-35 are pending. The specification has been amended to correct the informality set forth in the first Office action, and the claims, with the exception of amended claim 23 (which is claim 31 rewritten in independent form), have been amended so that the specification provides antecedent basis for the claims. The new abstract is acceptable. The claims have been amended to correct the informalities set forth in the first Office action. Correction of thee matters is noted with appreciation.

Applicant's arguments that amended independent claims 1, 11, and 23 have been amended such that these claims are no longer anticipated by McRae 6,923,616, Wilson 5,281,097, and Lee 6,341,939 have been carefully considered and are agreed with. Independent claims 1, 11, and 23 have been amended to include the limitations of dependent claims 9, 18, and 31, respectively. With regard to the rejections of claim 6, 9, 18, and 31 under 35 USC 103(a) as being unpatentable over either McRae, Wilson, or Lee in view of Chamberlin 2,915,279, Applicant has not provided specific arguments concerning these rejections under 35 USC 103(a) with regard to the teachings of Chamberlin, other than describing Chamberlin as having blades each with a platform with a corner between a face and an upstream face cut away at 24, with the cut away portion enabling cooling air to enter depressions 22 and form vortices which provide cooling to the blades, with a downstream side of the face including a cut away portion at 26 to enable the spent cooling air to be discharged from depressions 22. As set forth in the first Office action, Chamberlin shows cooled turbine blades 11 having platforms 12 with shank cavities 22 therebetween that are underneath the platforms, with the shank cavities being facilitated to be

pressurized by airflow entering the cavities through recessed portions 24 of rotor blade shank upstream sidewalls 15, and with a portion of trailing edges of the platforms near 16 being facilitated to be cooled by cooling air channeled through recessed portions 26 of the platforms. A portion of each trailing edge sidewall is recessed at 26 between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling. The arrangement is provided for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

With regard to the various provisional obviousness-type double patenting rejections set forth in the first Office action based on application 10/828,133 (which matured into Benjamin 7,147,440), Applicant has argued that the claims of the instant application do not simply restate recitations of Benjamin '440, and that the recitations of subject matter not found in the appropriate claims of Benjamin '440, together with the omission of subject matter found in Benjamin '440 is not obvious and is not merely a restatement of the prior language. Applicant has further argued that there is no apparent reason, considering only the claims of Benjamin '440, why one of ordinary skill in the art would omit certain recitations and include other recitations in a manner that would have resulted in the present claims. These arguments are not persuasive. An obviousness-type double patenting analysis requires comparing the claims of the an instant application with the claims of another patent or application for commonly claimed subject matter, and determining whether or not the differences would be obvious to a person having ordinary skill in the art. Such an analysis is sanctioned by MPEP 804 II(B)(1)(a) as well

as a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees, as cited later below. The obviousness-type double patenting rejections clearly set forth the differences between the conflicting claimed subject matter as well as stating the teachings of the prior art relied upon to arrive at a conclusion of obviousness.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

Claim 31, lines 8-9, which recite at least a portion of the trailing edge sidewall is recessed, has no antecedent basis in the specification for the underlined limitation.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2, 6, 11, and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over McRae 6,923,616 in view of Chamberlin 2,915,279. McRae discloses a method of assembling a rotor assembly for a gas turbine engine substantially as claimed, comprising providing a first rotor blade 52 that includes an airfoil 60, a platform 62, a shank 64, an internal cavity 82, and a dovetail 66, wherein the airfoil extends radially outward from the platform, the platform includes a radially outer surface and a radially inner surface, the shank extends radially inward from the platform, and the dovetail extends from the shank, such that the internal cavity is defined at least partially by the airfoil, the platform, the shank, and the dovetail, coupling the first rotor blade to a rotor shaft 32 using the dovetail such that during engine operation, cooling air is channeled from the blade cavity through a blade impingement cooling circuit 132 for impingement cooling the first rotor blade platform radially inner surface, and coupling a second adjacent rotor blade to the rotor shaft such that an unnumbered platform gap is defined between the first and second rotor blade platforms, with each shank including a pair of opposing sidewalls 120, 122 that extend generally axially between an upstream sidewall 124 and a downstream sidewall 126, the coupling a second rotor blade to the rotor shaft further comprises coupling the second rotor blade to the shaft such that an unnumbered shank cavity near 64 is defined between

the first and second rotor blade shanks. Also disclosed is a rotor blade for a gas turbine engine having the above features. The platform comprises a leading edge sidewall 124 and a trailing edge sidewall 126 connected together by a convex sidewall 122 and an opposite concave sidewall 120.

However, McRae does not disclose that during operation a portion of a trailing edge of the first rotor blade platform is facilitated to be cooled by cooling air channeled through a recessed portion of the platform (claim 1), does not disclose that the shank cavity is facilitated to be pressurized by airflow entering the cavity through a recessed portion of the rotor blade shank upstream sidewall (claim 6), and does not disclose that a portion of the trailing edge sidewall is recessed between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling (claims 11 and 23).

Chamberlin shows cooled turbine blades 11 having platforms 12 with shank cavities 22 therebetween that are underneath the platforms, with the shank cavities being facilitated to be pressurized by airflow entering the cavities through recessed portions 24 of rotor blade shank upstream sidewalls 15, and with a portion of trailing edges of the platforms near 16 being facilitated to be cooled by cooling air channeled through recessed portions 26 of the platforms. A portion of each trailing edge sidewall is recessed at 26 between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling. The arrangement is provided for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of

cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the rotor blade of McRae such that the shank cavity is facilitated to be pressurized by airflow entering the cavity through a recessed portion of the rotor blade shank upstream sidewall, and such that a portion of the trailing edge sidewall is recessed between the platform radially outer and radially inner surfaces, as taught by Chamberlin, for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

Claims 1-3, 6-8, 11-12, 16-17, 23-25, and 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson 5,281,097 in view of Chamberlin 2,915,279. Wilson discloses a method of assembling a rotor assembly for a gas turbine engine substantially as claimed, comprising providing a first rotor blade 18 that includes an airfoil 20, a platform 22, a shank 24, an internal cavity near 39, and a dovetail 16, wherein the airfoil extends radially outward from the platform, the platform includes a radially outer surface and a radially inner surface, the shank extends radially inward from the platform, and the dovetail extends from the shank, such that the internal cavity is defined at least partially by the airfoil, the platform, the shank, and the dovetail, coupling the first rotor blade to an unnumbered rotor shaft using the dovetail such that during engine operation, cooling air is channeled from the blade cavity through a blade impingement

cooling circuit 56 for impingement cooling the first rotor blade platform radially inner surface, and coupling a second adjacent rotor blade to the rotor shaft such that a platform gap 26 is defined between the first and second rotor blade platforms, with each shank including a pair of unnumbered opposing sidewalls that extend generally axially between an unnumbered upstream sidewall and an unnumbered downstream sidewall, the coupling a second rotor blade to the rotor shaft further comprises coupling the second rotor blade to the shaft such that an unnumbered shank cavity is defined between the first and second rotor blade shanks. During operation, cooling air is channeled from the shank cavity through a purge slot 46 defined within a portion of the platform radially inner surface. Concerning claim 7, the shank cavity is pressurized by airflow entering the cavity through a recessed portion 54 defined radially inward from an unnumbered angel wing extending outwardly from the rotor blade shank upstream sidewall. Concerning claim 8, a portion of the platform is convectively cooled by cooling air channeled through plural openings 46 extending partially through the platform. Concerning claims 12 and 25, the purge slot 46 is configured to channel cooling air through the purge slot for purging the gap 26 between adjacent rotor blade platforms. Concerning claims 16 and 29, the platform further comprises an unnumbered convex-side wall, an unnumbered concave-side wall and a plurality of convection cooling openings 46, the convex-side and concave-side walls each extend between the platform radially outer and radially inner surfaces, and the plurality of convection cooling openings 46 extend between the cavity and the platform concave-side wall for supplying cooling air for convective cooling of the platform concave-side wall. Concerning claims 17 and 30, a portion (the angled portion of the slot near 44 in figure 4) is chamfered to facilitate reducing a heat transfer coefficient of at least a portion of the platform. Also disclosed is a rotor

blade for a gas turbine engine having the above features. The platform comprises an unnumbered leading edge sidewall near 28 in figure 3 and an unnumbered trailing edge sidewall near 22 in figure 3 connected together by an unnumbered convex sidewall and an unnumbered opposite concave sidewall (figures 6-7) .

However, Wilson does not disclose that during operation a portion of a trailing edge of the first rotor blade platform is facilitated to be cooled by cooling air channeled through a recessed portion of the platform (claim 1), does not disclose that the shank cavity is facilitated to be pressurized by airflow entering the cavity through a recessed portion of the rotor blade shank upstream sidewall (claim 6), and does not disclose that a portion of the trailing edge sidewall is recessed between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling (claims 11 and 23).

Chamberlin shows cooled turbine blades 11 having platforms 12 with shank cavities 22 therebetween that are underneath the platforms, with the shank cavities being facilitated to be pressurized by airflow entering the cavities through recessed portions 24 of rotor blade shank upstream sidewalls 15, and with a portion of trailing edges of the platforms near 16 being facilitated to be cooled by cooling air channeled through recessed portions 26 of the platforms. A portion of each trailing edge sidewall is recessed at 26 between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling. The arrangement is provided for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of

cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the rotor blade of Wilson such that the shank cavity is facilitated to be pressurized by airflow entering the cavity through a recessed portion of the rotor blade shank upstream sidewall, and such that a portion of the trailing edge sidewall is recessed between the platform radially outer and radially inner surfaces, as taught by Chamberlin, for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

Claims 1-6, 8, 11, 13-17, 23-24, and 26-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee 6,341,939 in view of Chamberlin 2,915,279. Lee discloses a method of assembling a rotor assembly for a gas turbine engine substantially as claimed, comprising providing a first rotor blade 10 that includes an airfoil 18, a platform 20, a shank 22, an internal cavity 28, and a dovetail 24, wherein the airfoil extends radially outward from the platform, the platform includes a radially outer surface and a radially inner surface, the shank extends radially inward from the platform, and the dovetail extends from the shank, such that the internal cavity is defined at least partially by the airfoil, the platform, the shank, and the dovetail, coupling the first rotor blade to an unnumbered rotor shaft using the dovetail such that during engine operation, cooling air is channeled from the blade cavity through a blade impingement cooling

circuit 36 for impingement cooling the first rotor blade platform radially inner surface, and coupling a second adjacent rotor blade to the rotor shaft such that an unnumbered platform gap is defined between the first and second rotor blade platforms, with each shank including a pair of unnumbered opposing sidewalls that extend generally axially between an unnumbered upstream sidewall and an unnumbered downstream sidewall, the coupling a second rotor blade to the rotor shaft further comprises coupling the second rotor blade to the shaft such that an unnumbered shank cavity is defined between the first and second rotor blade shanks. During operation, cooling air is channeled from the shank cavity through a purge slot 42 defined within a portion of the platform radially inner surface. During operation, the platform radially outer surface is film cooled as well as convectively cooled by cooling air channeled through plural film cooling holes 38 that extend between the platform radially inner and outer surfaces. Concerning claims 14 and 27, the shank extends axially between an unnumbered forward sidewall and an unnumbered aft sidewall, with a portion of the forward sidewall being recessed underneath the platform near 18c in figure 2, to facilitate increasing pressure of cooling air supplied through the plural film cooling openings. Concerning claims 15 and 28, note the angel wing 20d extending outward from the shank forward sidewall, with an unnumbered portion of the shank forward sidewall radially inward from the angel wing 20d being recessed, to facilitate pressurizing the shank cavity. Concerning claims 16 and 29, the platform further comprises an unnumbered convex-side wall, an unnumbered concave-side wall and a plurality of convection cooling openings 38, the convex-side and concave-side walls each extend between the platform radially outer and radially inner surfaces, and the plurality of convection cooling openings 38 extend between the cavity and the platform concave-side wall for supplying cooling air for convective cooling of the platform

concave-side wall. Concerning claims 17 and 30, a portion (the angled portion near 20b in figure 4) is chamfered to facilitate reducing a heat transfer coefficient of at least a portion of the platform. Also disclosed is a rotor blade for a gas turbine engine having the above features. The platform comprises an unnumbered leading edge sidewall near 20d and an unnumbered trailing edge sidewall near 20e connected together by an unnumbered convex sidewall near 22 and an unnumbered opposite concave sidewall near 36b (figure 4).

However, Lee does not disclose that during operation a portion of a trailing edge of the first rotor blade platform is facilitated to be cooled by cooling air channeled through a recessed portion of the platform (claim 1), does not disclose that the shank cavity is facilitated to be pressurized by airflow entering the cavity through a recessed portion of the rotor blade shank upstream sidewall (claim 6), and does not disclose that a portion of the trailing edge sidewall is recessed between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling (claims 11 and 23).

Chamberlin shows cooled turbine blades 11 having platforms 12 with shank cavities 22 therebetween that are underneath the platforms, with the shank cavities being facilitated to be pressurized by airflow entering the cavities through recessed portions 24 of rotor blade shank upstream sidewalls 15, and with a portion of trailing edges of the platforms near 16 being facilitated to be cooled by cooling air channeled through recessed portions 26 of the platforms. A portion of each trailing edge sidewall is recessed at 26 between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling. The arrangement is provided

for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the rotor blade of Lee such that the shank cavity is facilitated to be pressurized by airflow entering the cavity through a recessed portion of the rotor blade shank upstream sidewall, and such that a portion of the trailing edge sidewall is recessed between the platform radially outer and radially inner surfaces, as taught by Chamberlin, for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

Claims 19, 21-22, 32, and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over McRae 6,923,616 and Chamberlin 2,915,279 as applied to claims 11 and 23 above, and further in view of Tomberg 6,808,368. The modified arrangement of McRae shows all of the claimed subject matter except for the shank further comprising a leading edge seal pin cavity and a trailing edge seal pin cavity with each seal pin cavity configured to facilitate sealing between adjacent rotor blades (claim 19), except for least one of the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by a radially outer sidewall that extends obliquely between the axially disposed sidewalls (claims 21 and 34), except for the radially outer oblique sidewall

facilitating enhancing radial pin sealing between adjacent rotor blades (claims 22 and 35), and except for the seal pin cavities sized to receive a seal pin therein to facilitate sealing between adjacent blades (claim 32).

Tomberg (figure 3) shows rotor blades for a gas turbine engine, having shanks 32, with each shank further comprising an unnumbered leading edge seal pin cavity and an unnumbered trailing edge seal pin cavity with each seal pin cavity configured to facilitate sealing between adjacent rotor blades, with the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by an unnumbered radially outer sidewall that extends obliquely between the axially disposed sidewalls, with the radially outer oblique sidewall facilitating enhancing radial pin sealing between adjacent rotor blades, with the seal pin cavities sized to receive a seal pin therein to facilitate sealing between adjacent blades, for the purpose of providing blade to blade sealing between adjacent rotor blade platforms 30.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified rotor blade of McRae such that the shank further comprises a leading edge seal pin cavity and a trailing edge seal pin cavity with each seal pin cavity configured to facilitate sealing between adjacent rotor blades, with at least one of the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by a radially outer sidewall that extends obliquely between the axially disposed sidewalls, with the radially outer oblique

sidewall facilitating enhancing radial pin sealing between adjacent rotor blades, and with the seal pin cavities sized to receive a seal pin therein to facilitate sealing between adjacent blades, as taught by Tomberg, for the purpose of providing blade to blade sealing between adjacent rotor blade platforms.

Claims 19, 21-22, 32, and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilson 5,281,097 and Chamberlin 2,915,279 as applied to claims 11 and 23 above, and further in view of Tomberg 6,808,368. The modified arrangement of Wilson shows all of the claimed subject matter except for the shank further comprising a leading edge seal pin cavity and a trailing edge seal pin cavity with each seal pin cavity configured to facilitate sealing between adjacent rotor blades (claim 19), except for least one of the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by a radially outer sidewall that extends obliquely between the axially disposed sidewalls (claims 21 and 34), except for the radially outer oblique sidewall facilitating enhancing radial pin sealing between adjacent rotor blades (claims 22 and 35), and except for the seal pin cavities sized to receive a seal pin therein to facilitate sealing between adjacent blades (claim 32).

Tomberg (figure 3) shows rotor blades for a gas turbine engine, having shanks 32, with each shank further comprising an unnumbered leading edge seal pin cavity and an unnumbered trailing edge seal pin cavity with each seal pin cavity configured to facilitate sealing between adjacent rotor blades, with the leading edge seal pin cavity and the trailing edge seal pin cavity

being defined by a pair of substantially parallel axially disposed sidewalls that are connected by an unnumbered radially outer sidewall that extends obliquely between the axially disposed sidewalls, with the radially outer oblique sidewall facilitating enhancing radial pin sealing between adjacent rotor blades, with the seal pin cavities sized to receive a seal pin therein to facilitate sealing between adjacent blades, for the purpose of providing blade to blade sealing between adjacent rotor blade platforms 30.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified rotor blade of Wilson such that the shank further comprises a leading edge seal pin cavity and a trailing edge seal pin cavity with each seal pin cavity configured to facilitate sealing between adjacent rotor blades, with at least one of the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by a radially outer sidewall that extends obliquely between the axially disposed sidewalls, with the radially outer oblique sidewall facilitating enhancing radial pin sealing between adjacent rotor blades, and with the seal pin cavities sized to receive a seal pin therein to facilitate sealing between adjacent blades, as taught by Tomberg, for the purpose of providing blade to blade sealing between adjacent rotor blade platforms.

Claims 19, 21-22, 32, and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee 6,341,939 and Chamberlin 2,915,279 as applied to claims 11 and 23 above, and further in view of Tomberg 6,808,368. The modified arrangement of Lee shows all

of the claimed subject matter except for the shank further comprising a leading edge seal pin cavity and a trailing edge seal pin cavity with each seal pin cavity configured to facilitate sealing between adjacent rotor blades (claim 19), except for least one of the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by a radially outer sidewall that extends obliquely between the axially disposed sidewalls (claims 21 and 34), except for the radially outer oblique sidewall facilitating enhancing radial pin sealing between adjacent rotor blades (claims 22 and 35), and except for the seal pin cavities sized to receive a seal pin therein to facilitate sealing between adjacent blades (claim 32).

Tomberg (figure 3) shows rotor blades for a gas turbine engine, having shanks 32, with each shank further comprising an unnumbered leading edge seal pin cavity and an unnumbered trailing edge seal pin cavity with each seal pin cavity configured to facilitate sealing between adjacent rotor blades, with the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by an unnumbered radially outer sidewall that extends obliquely between the axially disposed sidewalls, with the radially outer oblique sidewall facilitating enhancing radial pin sealing between adjacent rotor blades, with the seal pin cavities sized to receive a seal pin therein to facilitate sealing between adjacent blades, for the purpose of providing blade to blade sealing between adjacent rotor blade platforms 30.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified rotor blade of Lee such that the shank further comprises a leading edge seal pin cavity and a trailing edge seal pin cavity with each seal pin cavity configured to facilitate sealing between adjacent rotor blades, with at least one of the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by a radially outer sidewall that extends obliquely between the axially disposed sidewalls, with the radially outer oblique sidewall facilitating enhancing radial pin sealing between adjacent rotor blades, and with the seal pin cavities sized to receive a seal pin therein to facilitate sealing between adjacent blades, as taught by Tomberg, for the purpose of providing blade to blade sealing between adjacent rotor blade platforms.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1, 2, 3, 4, 5, 6, 7, 8, and 10 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1, 1, 2, 4, 4, 1, 1, 1, and 8, respectively, of U.S. Patent No. 7,147,440 in view of Wilson 5,281,097 and Chamberlin 2,915,279. The above claims of U.S. Patent No. 7,147,440 claim substantially the same subject matter as the above claims of the instant application, including a method for assembling a rotor assembly for a gas turbine engine, but do not claim that the airfoil extends radially outward from the platform, do not claim that the shank extends radially inward from the platform, do not claim that the dovetail extends from the shank, and do not claim that the internal cavity is defined at least partially by the airfoil, the platform, and the dovetail, and do not claim that during operation, cooling air is channeled from the shank cavity through a purge slot defined within at least a portion of the platform radially inner surface. The above claims of U.S. Patent No. 7,147,440 also do not claim that during operation a portion of a trailing edge of the first rotor blade platform is facilitated to be cooled by cooling air channeled through a recessed portion of the platform (claim 1), and do not claim that the shank cavity is facilitated to be pressurized by airflow entering the cavity through a recessed portion of the rotor blade shank upstream sidewall (claim 6).

Wilson shows a cooled rotor blade 18 having an airfoil 20 that extends radially outward from a platform 22, a shank 24 that extends radially inward from the platform, and a dovetail 16 that extends from the shank, with an internal cavity 39 defined at least partially by the airfoil, the platform, and the dovetail, such that during operation, cooling air is channeled from the shank

cavity through a purge slot 46 defined within at least a portion of the platform radially inner surface, for the purpose of forming a blade under platform cooling circuit.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the rotor blades in the above claims of U.S. Patent No. 7,147,440 such that the airfoil extends radially outward from the platform, the shank extends radially inward from the platform, the dovetail extends from the shank, the internal cavity is defined at least partially by the airfoil, the platform, and the dovetail, and such that that during operation, cooling air is channeled from the shank cavity through a purge slot defined within at least a portion of the platform radially inner surface, as taught by Wilson.

Chamberlin shows cooled turbine blades 11 having platforms 12 with shank cavities 22 therebetween that are underneath the platforms, with the shank cavities being facilitated to be pressurized by airflow entering the cavities through recessed portions 24 of rotor blade shank upstream sidewalls 15, and with a portion of trailing edges of the platforms near 16 being facilitated to be cooled by cooling air channeled through recessed portions 26 of the platforms. A portion of each trailing edge sidewall is recessed at 26 between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling. The arrangement is provided for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified rotor blade of the above claims of U.S. Patent No. 7,147,440 such that the shank cavity is facilitated to be pressurized by airflow entering the cavity through a recessed portion of the rotor blade shank upstream sidewall, as taught by Chamberlin. Concerning the additional limitations recited in the claims of U.S. Patent No. 7,147,440, such as the leading edge, trailing edge, and trailing edge openings, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to eliminate these features for the purposes of reducing complexity and cost.

Claims 11, 12, 13, 16, 17, 19, and 20 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 9, 9, 10, 9, 9, 14, and 14, respectively, of U.S. Patent No. 7,147,440 in view of Wilson 5,281,097 and Chamberlin 2,915,279. The above claims of U.S. Patent No. 7,147,440 claim substantially the same subject matter as the above claims of the instant application, including a rotor blade for a gas turbine engine, but do not claim that the internal cavity is defined at least partially by the airfoil, the platform, and the dovetail. The above claims of U.S. Patent No. 7,147,440 also do not claim that the platform comprises a leading edge sidewall and a trailing edge sidewall connected together by a convex sidewall and an opposite concave sidewall, with a portion of the trailing edge sidewall recessed between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling (claim 11).

Wilson shows a cooled rotor blade 18 having an airfoil 20, a platform 22, a shank 24, and a dovetail 16, with an internal cavity 39 defined at least partially by the airfoil, the platform, and the dovetail, such that during operation, cooling air is channeled from the shank cavity, for the purpose of forming a blade under platform cooling circuit. The platform comprises an unnumbered leading edge sidewall near 28 in figure 3 and an unnumbered trailing edge sidewall near 22 in figure 3 connected together by an unnumbered convex sidewall and an unnumbered opposite concave sidewall (figures 6-7), for the purpose of forming a smooth internal cavity.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the rotor blades in the above claims of U.S. Patent No. 7,147,440 such that the internal cavity is defined at least partially by the airfoil, the platform, and the dovetail, as taught by Wilson, and such that the platform comprises a leading edge sidewall and a trailing edge sidewall connected together by a convex sidewall and an opposite concave sidewall, as taught by Wilson.

Chamberlin shows cooled turbine blades 11 having platforms 12 with shank cavities 22 therebetween that are underneath the platforms, with the shank cavities being facilitated to be pressurized by airflow entering the cavities through recessed portions 24 of rotor blade shank upstream sidewalls 15, and with a portion of trailing edges of the platforms near 16 being facilitated to be cooled by cooling air channeled through recessed portions 26 of the platforms. A portion of each trailing edge sidewall is recessed at 26 between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling. The arrangement is provided

for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified rotor blade of the above claims of U.S. Patent No. 7,147,440 such that a portion of the trailing edge sidewall is recessed between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling, as taught by Chamberlin. Concerning the additional limitations recited in the claims of U.S. Patent No. 7,147,440, such as the recessed area, and the airfoil first sidewall and second sidewall, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to eliminate these features for the purposes of reducing complexity and cost.

Claims 21-22 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 14 of U.S. Patent No. 7,147,440 and Wilson 5,281,097 and Chamberlin 2,915,279 as applied above, and further in view of Tomberg 6,808,368. The modified rotor blade of claim 14 of U.S. Patent No. 7,147,440 claims all of the subject matter except for at least one of the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by a radially outer sidewall that extends obliquely between the axially disposed sidewalls (claim 21), and except for the radially outer oblique sidewall facilitating enhancing radial pin sealing between adjacent rotor blades (claim 22).

Tomberg (figure 3) shows rotor blades for a gas turbine engine, having shanks 32, with each shank further comprising an unnumbered leading edge seal pin cavity and an unnumbered trailing edge seal pin cavity with each seal pin cavity configured to facilitate sealing between adjacent rotor blades, with the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by an unnumbered radially outer sidewall that extends obliquely between the axially disposed sidewalls, with the radially outer oblique sidewall facilitating enhancing radial pin sealing between adjacent rotor blades, with the seal pin cavities sized to receive a seal pin therein to facilitate sealing between adjacent blades, for the purpose of providing blade to blade sealing between adjacent rotor blade platforms 30.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified rotor blade of claim 14 of U.S. Patent No. 7,147,440 such that at least one of the leading edge seal pin cavity and the trailing edge seal pin cavity is defined by a pair of substantially parallel axially disposed sidewalls that are connected by a radially outer sidewall that extends obliquely between the axially disposed sidewalls, and such that the radially outer oblique sidewall facilitates enhancing radial pin sealing between adjacent rotor blades, as taught by Tomberg.

Claims 23, 24, 25, 26, 27, 29, 30, 32, and 33 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 16, 16, 16, 18,

19, 16, 16, 20, and 21, respectively, of U.S. Patent No. 7,147,440 in view of Wilson 5,281,097 and Chamberlin 2,915,279. The above claims of U.S. Patent No. 7,147,440 claim substantially the same subject matter as the above claims of the instant application, including a rotor blade for a gas turbine engine, but do not claim that the internal cavity is defined at least partially by the airfoil, the platform, and the dovetail, and do not claim an impingement cooling circuit extending through a portion of the shank for channeling cooling air from the blade cavity for impingement cooling the platform radially inner surface. The above claims of U.S. Patent No. 7,147,440 also do not claim that the platform comprises a leading edge sidewall and a trailing edge sidewall connected together by a pair of oppositely disposed platform sidewalls, with a portion of the trailing edge sidewall is recessed between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling (claim 23).

Wilson shows a cooled rotor blade 18 having an airfoil 20, a platform 22, a shank 24, and a dovetail 16, with an internal cavity 39 defined at least partially by the airfoil, the platform, and the dovetail, with an impingement cooling circuit 56 extending through a portion of the shank such that cooling air is channeled from the blade cavity, for the purpose of impingement cooling the platform radially inner surface. The platform comprises an unnumbered leading edge sidewall near 28 in figure 3 and an unnumbered trailing edge sidewall near 22 in figure 3 connected together by an unnumbered convex sidewall and an unnumbered opposite concave sidewall (figures 6-7), for the purpose of forming a smooth internal cavity.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the rotor blades in the above claims of U.S. Patent No. 7,147,440 such that the internal cavity is defined at least partially by the airfoil, the platform, and the dovetail, and such that an impingement cooling circuit extends through a portion of the shank for channeling cooling air from the blade cavity for impingement cooling the platform radially inner surface, and such that the platform comprises a leading edge sidewall and a trailing edge sidewall connected together by a convex sidewall and an opposite concave sidewall, as taught by Wilson.

Chamberlin shows cooled turbine blades 11 having platforms 12 with shank cavities 22 therebetween that are underneath the platforms, with the shank cavities being facilitated to be pressurized by airflow entering the cavities through recessed portions 24 of rotor blade shank upstream sidewalls 15, and with a portion of trailing edges of the platforms near 16 being facilitated to be cooled by cooling air channeled through recessed portions 26 of the platforms. A portion of each trailing edge sidewall is recessed at 26 between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling. The arrangement is provided for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified rotor blade of the above claims of U.S. Patent No. 7,147,440 such that a portion of the trailing edge sidewall is recessed between the platform

radially outer and radially inner surfaces to facilitate platform trailing edge cooling, as taught by Chamberlin. Concerning the additional limitations recited in the claims of U.S. Patent No. 7,147,440, such as the platform recessed area and the airfoil trailing edge stress reduction, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to eliminate these features for the purposes of reducing complexity and cost.

Claims 34-35 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claim 20 of U.S. Patent No. 7,147,440 and Wilson 5,281,097 and Chamberlin 2,915,279 as applied above, and further in view of Tomberg 6,808,368. The modified rotor blade of claim 20 of U.S. Patent No. 7,147,440 claims all of the subject matter except for at least one of the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by a radially outer sidewall that extends obliquely between the axially disposed sidewalls (claim 34), and except for the radially outer oblique sidewall facilitating enhancing radial pin sealing between adjacent rotor blades (claim 35).

Tomberg (figure 3) shows rotor blades for a gas turbine engine, having shanks 32, with each shank further comprising an unnumbered leading edge seal pin cavity and an unnumbered trailing edge seal pin cavity with each seal pin cavity configured to facilitate sealing between adjacent rotor blades, with the leading edge seal pin cavity and the trailing edge seal pin cavity being defined by a pair of substantially parallel axially disposed sidewalls that are connected by an unnumbered radially outer sidewall that extends obliquely between the axially disposed

sidewalls, with the radially outer oblique sidewall facilitating enhancing radial pin sealing between adjacent rotor blades, with the seal pin cavities sized to receive a seal pin therein to facilitate sealing between adjacent blades, for the purpose of providing blade to blade sealing between adjacent rotor blade platforms 30.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified rotor blade of claim 20 of U.S. Patent No. 7,147,440 such that at least one of the leading edge seal pin cavity and the trailing edge seal pin cavity is defined by a pair of substantially parallel axially disposed sidewalls that are connected by a radially outer sidewall that extends obliquely between the axially disposed sidewalls, and such that the radially outer oblique sidewall facilitates enhancing radial pin sealing between adjacent rotor blades, as taught by Tomberg.

Claims 11, 13, 14, 15, 16, 17, and 19 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 9, 10, 10, 10, 9, 9, and 9, respectively, of U.S. Patent No. 7,147,440 in view of Lee 6,341,939 and Chamberlin 2,915,279. The above claims of U.S. Patent No. 7,147,440 claim substantially the same subject matter as the above claims of the instant application, including a rotor blade for a gas turbine engine, but do not claim that the internal cavity is defined at least partially by the airfoil, the platform, and the dovetail (claim 11), do not claim at least a portion of the forward sidewall being recessed to facilitate increasing pressure of cooling air supplied through the plural film cooling openings (claim 14), do not claim the shank comprising an angel wing extending outward from the shank

forward sidewall, with at least a portion of the shank forward sidewall radially inward form the angel wing being recessed (claim 15), do not claim the platform comprising a convex-side wall, a concave-side wall and a plurality of convection cooling openings, the convex-side and concave-side walls each extending between the platform radially outer and radially inner surfaces, and the plurality of convection cooling openings extending between the cavity and the platform concave-side wall for supplying cooling air for convective cooling of the platform concave-side wall (claim 16), and do not claim a portion of the platform being chamfered to facilitate reducing a heat transfer coefficient of at least a portion of the platform (claim 17). The above claims of U.S. Patent No. 7,147,440 also do not claim that the platform comprises a leading edge sidewall and a trailing edge sidewall connected together by a convex sidewall and an opposite concave sidewall, with a portion of the trailing edge sidewall recessed between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling (claim 11).

Lee shows a cooled rotor blade 18 having an airfoil 20, a platform 22, a shank 24, and a dovetail 16, with an internal cavity 39 defined at least partially by the airfoil, the platform, and the dovetail, such that during operation, cooling air is channeled from the shank cavity. At least a portion of a forward sidewall is recessed to facilitate increasing pressure of cooling air supplied through plural film cooling openings 38, and the shank comprises an angel wing 20d extending outward from the shank forward sidewall, with at least a portion of the shank forward sidewall radially inward form the angel wing being recessed, with the platform comprising an unnumbered convex-side wall, an unnumbered concave-side wall and a plurality of convection

cooling openings 38, the convex-side and concave-side walls each extending between the platform radially outer and radially inner surfaces, and the plurality of convection cooling openings extending between the cavity and the platform concave-side wall for supplying cooling air for convective cooling of the platform concave-side wall, with a portion of the platform being chamfered near 20b in figure 4 to facilitate reducing a heat transfer coefficient of at least a portion of the platform, for the purpose of forming a blade under platform cooling circuit. The platform comprises an unnumbered leading edge sidewall near 20d and an unnumbered trailing edge sidewall near 20e connected together by an unnumbered convex sidewall near 22 and an unnumbered opposite concave sidewall near 36b (figure 4), for the purpose of forming a smooth internal cavity.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the rotor blades in the above claims of U.S. Patent No. 7,147,440 such the internal cavity is defined at least partially by the airfoil, the platform, and the dovetail, with at least a portion of the forward sidewall being recessed to facilitate increasing pressure of cooling air supplied through the plural film cooling openings, with the shank comprising an angel wing extending outward from the shank forward sidewall, with at least a portion of the shank forward sidewall radially inward form the angel wing being recessed, with the platform comprising a convex-side wall, a concave-side wall and a plurality of convection cooling openings, the convex-side and concave-side walls each extending between the platform radially outer and radially inner surfaces, and the plurality of convection cooling openings extending between the cavity and the platform concave-side wall for supplying cooling air for convective

cooling of the platform concave-side wall, with a portion of the platform being chamfered to facilitate reducing a heat transfer coefficient of at least a portion of the platform, and with the platform comprising a leading edge sidewall and a trailing edge sidewall connected together by a convex sidewall and an opposite concave sidewall, as taught by Lee.

Chamberlin shows cooled turbine blades 11 having platforms 12 with shank cavities 22 therebetween that are underneath the platforms, with the shank cavities being facilitated to be pressurized by airflow entering the cavities through recessed portions 24 of rotor blade shank upstream sidewalls 15, and with a portion of trailing edges of the platforms near 16 being facilitated to be cooled by cooling air channeled through recessed portions 26 of the platforms. A portion of each trailing edge sidewall is recessed at 26 between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling. The arrangement is provided for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified rotor blade of the above claims of U.S. Patent No. 7,147,440 such that a portion of the trailing edge sidewall is recessed between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling, as taught by Chamberlin. Concerning the additional limitations recited in the claims of U.S. Patent No. 7,147,440, such as the recessed area, and the airfoil first sidewall and second sidewall, it would

have been obvious at the time the invention was made to a person having ordinary skill in the art to eliminate these features for the purposes of reducing complexity and cost.

Claims 23, 24, 26, 27, 28, 29, 30, 32, and 33 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 16, 16, 18, 19, 16, 16, 16, 20, and 20, respectively, of U.S. Patent No. 7,147,440 in view of Lee 6,341,939 and Chamberlin 2,915,279. The above claims of U.S. Patent No. 7,147,440 claim substantially the same subject matter as the above claims of the instant application, including a rotor blade for a gas turbine engine, but do not claim that the internal cavity is defined at least partially by the airfoil, the platform, and the dovetail, and do not claim an impingement cooling circuit extending through a portion of the shank for channeling cooling air from the blade cavity for impingement cooling the platform radially inner surface. The above claims of U.S. Patent No. 7,147,440 also do not claim that the platform comprises a leading edge sidewall and a trailing edge sidewall connected together by a pair of oppositely disposed platform sidewalls, with a portion of the trailing edge sidewall is recessed between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling (claim 23).

Lee shows a cooled rotor blade 10 having an airfoil 18, a platform 20, a shank 22, and a dovetail 24, with an internal cavity 28 defined at least partially by the airfoil, the platform, and the dovetail, with an impingement cooling circuit 36 extending through a portion of the shank such that cooling air is channeled from the blade cavity, for the purpose of impingement cooling the platform radially inner surface. The platform comprises an unnumbered leading edge

sidewall near 20d and an unnumbered trailing edge sidewall near 20e connected together by an unnumbered convex sidewall near 22 and an unnumbered opposite concave sidewall near 36b (figure 4), for the purpose of forming a smooth internal cavity.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to form the rotor blades in the above claims of U.S. Patent No. 7,147,440 such that the internal cavity is defined at least partially by the airfoil, the platform, and the dovetail, such that an impingement cooling circuit extends through a portion of the shank for channeling cooling air from the blade cavity for impingement cooling the platform radially inner surface, and such that the platform comprises a leading edge sidewall and a trailing edge sidewall connected together by a pair of oppositely disposed platform sidewalls, as taught by Lee.

Chamberlin shows cooled turbine blades 11 having platforms 12 with shank cavities 22 therebetween that are underneath the platforms, with the shank cavities being facilitated to be pressurized by airflow entering the cavities through recessed portions 24 of rotor blade shank upstream sidewalls 15, and with a portion of trailing edges of the platforms near 16 being facilitated to be cooled by cooling air channeled through recessed portions 26 of the platforms. A portion of each trailing edge sidewall is recessed at 26 between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling. The arrangement is provided for the purposes of creating eddies or vorticies in the cavities to improve the cooling effect of cooling air such that substantially the whole inner surfaces of the cavities are swept by cooling air and providing trailing edge cooling of the platform.

It would have been further obvious at the time the invention was made to a person having ordinary skill in the art to form the modified rotor blade of the above claims of U.S. Patent No. 7,147,440 such that a portion of the trailing edge sidewall is recessed between the platform radially outer and radially inner surfaces to facilitate platform trailing edge cooling, as taught by Chamberlin. Concerning the additional limitations recited in the claims of U.S. Patent No. 7,147,440, such as the platform recessed area and the airfoil trailing edge stress reduction, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to eliminate these features for the purposes of reducing complexity and cost.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher Verdier whose telephone number is (571) 272-4824. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward K. Look can be reached on (571) 272-4820. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

C.V.
October 28, 2007

Christopher Verdier
Primary Examiner
Art Unit 3745